U.S. Department
of Transportation

Federal Aviation
Administration

Air Traffic Bulletin

New Technology – ADS-B, TIS-B, and FIS-B

/*TERF/Background

Automatic Dependent Surveillance-Broadcast (ADS-B) is a surveillance technology being deployed in selected areas of the National Airspace System (NAS). ADS-B avionics broadcast a radio transmission approximately once per second containing the aircraft's position, velocity, identification, and other information. Since the aircraft's position is normally derived from the Global Positioning System, the broadcast position information is highly accurate. ADS-B-equipped aircraft with cockpit displays can receive ADS-B reports from other suitably-equipped aircraft within reception range (Nominally 200 nautical miles.) Additionally, these broadcasts can be received by ground-based transceivers (GBT) to provide air traffic surveillance services, along with fleet operator monitoring of aircraft.

In the United States (U.S.), two different data links have been adopted for use with ADS-B: 1090 MHz extended squitter (1090 ES) and the universal access transceiver (UAT). The 1090 ES link is intended for air transport aircraft and above, whereas the UAT link is intended for general aviation aircraft. From a controller or pilot standpoint, the two links operate similarly.

In addition to ADS-B, these data links also support broadcast uplink services. Both UAT and 1090 ES support Traffic Information Service-Broadcast (TIS-B) and the UAT link supports Flight Information Services-Broadcast (FIS-B).

The FAA is developing policy and guidance material for ADS-B, TIS-B, and FIS-B that, when mature, will be published in traditional source references such as the Aeronautical Information Manual (AIM), advisory circulars, etc. In the meantime, preliminary reference material pertaining to this emerging technology, including details about initial operational applications and operational approval guidance, is posted on the FAA-managed Web site: www.flyadsb.com. This Web site maintains the current status on ADS-B and TIS-B/FIS-B availability and is the FAA's official source of ADS-B, TIS-B, and FIS-B guidance until the material is formally published.

Automatic Dependent Surveillance–Broadcast (ADS-B)

ADS-B provides surveillance service in areas without radar and can enhance existing radar by providing greater target accuracy and higher update rate. Initial air-to-air applications of ADS-B are for ***advisory use only***, enhancing a pilot's visual acquisition of other nearby similarly-equipped aircraft either when airborne or on the airport surface. ADS-B may enable fleet operators to monitor aircraft. Future applications of ADS-B may include enhanced search and rescue operations and advanced air-to-air applications such as spacing, sequencing, and merging.

Typical ADS-B avionics allow pilots to enter the aircraft's call sign and air traffic control-assigned transponder code, which will be transmitted to other aircraft and ground receivers. Pilots are being cautioned to use care when selecting and entering the aircraft's identification and transponder code. UAT systems provide a visual flight rules (VFR) "privacy" mode switch position that may be used by pilots not wanting to receive air traffic services. This feature will broadcast a "VFR" identification to other aircraft and ground receivers, similar to the "1200" transponder code.

Traffic Information Services-Broadcast (TIS-B)

TIS-B is the broadcast of traffic information to ADS-B-equipped aircraft from ADS-B GBTs. The source of this traffic information is derived from air traffic surveillance radars. TIS-B is intended to provide ADS-B-equipped aircraft with a more complete traffic picture in situations where not all nearby aircraft are equipped with ADS-B. This advisory-only application will enhance a pilot's visual acquisition of other traffic. TIS-B service is becoming available in selected locations where there is both adequate radar surveillance coverage and adequate broadcast coverage from GBTs.

For an aircraft to receive TIS-B services, the following conditions must exist:

- The aircraft must be equipped with an ADS-B transceiver and a cockpit display of traffic information (CDTI). TIS-B services are currently only available on the UAT data link.
- The aircraft must fly within the coverage volume of a compatible GBT that is configured for TIS-B uplinks.
- The target aircraft must be within the coverage of, and detected by, at least one of the ATC radars serving the GBT in use.

TIS-B relies on the secondary radar detection of aircraft with an operating transponder (Mode A/C or Mode S). Radar siting may result in limited radar surveillance coverage at lower altitudes near some general aviation airports. If an area has no radar coverage, then that area will have no TIS-B coverage.

Flight Information Services–Broadcast (FIS-B)

FIS-B is the ground-to-air broadcast of meteorological and aeronautical information. FIS-B products may be textually or graphically depicted. FIS-B allows the pilot to passively collect and display weather and other operational data. In addition to textual weather products such as aviation routine weather report (METAR), aviation special selected weather reports (SPECI), and terminal aerodrome forecasts (TAF), graphical weather products such as radar composite/mosaic images, temporary flight restricted airspace, and other notices to airmen (NOTAM) may be provided to the cockpit. FIS-B reception is line of sight and can be expected within 200 nautical miles (nominal range) of each UAT GBT.

Limitations of ADS-B and TIS-B

The cockpit display of ADS-B/TIS-B traffic is NOT intended to be used as a collision avoidance system and does not relieve the pilot of responsibility to "see and avoid" other aircraft. The CDTI is intended only to assist pilots with the visual acquisition of other aircraft and will not be used for avoidance maneuvers during times when there is no visual contact with the other aircraft.

Presently, no air traffic services or handling is predicated on the availability of an ADS-B/TIS-B cockpit display. A "traffic-in-sight" reply to Air Traffic Control (ATC) must be based on seeing an aircraft out-the-window; ***NOT*** on the cockpit display.

GBT Deployment and ADS-B Activities in the NAS

To date, 37 GBT sites have been installed. These include 15 in Alaska and 22 in the 48 contiguous states, mainly along the east coast and in the area around Phoenix, AZ. All GBTs provide broadcast services. Those in Alaska additionally provide air traffic services. (See the Web site [www.flyadsb.com] for the most current coverage tables and coverage charts.)

In the western area of Alaska around Bethel, the Anchorage Air Route Traffic Control Center (ARTCC) has been using ADS-B as an approved source of ATC surveillance outside radar coverage since January 1, 2001. The Capstone Program has equipped over 200 commercial aircraft in southwest Alaska with ADS-B avionics. Plans are underway to expand the area of ADS-B surveillance coverage to other portions of Alaska and to further examine the benefits of this new technology.

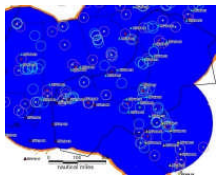
Announcements of Temporary Disruptions in ADS-B Broadcast Services

ADS-B broadcast services (TIS-B and FIS-B) are presently a "developmental service." This means that while the services are being provided today, they are being done so through a developmental infrastructure system undergoing rapid growth and expansion. Consequently, new ground stations are being added and periodic outages may likely occur as the system matures. In the future, outages will be announced via NOTAM.

TIS-B & FIS-B

FAA Implements TIS-B, FIS-B Traffic And Weather Service From Jacksonville, FL
Free Services For ADS-B Equipped Aircraft

Pilots who fly in or near Jacksonville, FL (ZJX) can now receive free traffic and weather broadcast information in the cockpit. To receive these services, aircraft must be equipped with an Automatic Dependent Surveillance - Broadcast (ADS-B) transmitter/receiver or transceiver and compatible cockpit display.



FAA Jacksonville TIS-B FIS-B Coverage Map

The new services include **Flight Information Service - Broadcast** (**FIS-B**), which provides pilots and flight crews with a cockpit display of aviation weather and aeronautical information via Universal Access Transceiver (UAT) equipment on 978 MHz. The FAA notes that FIS-B is not compatible with 1090ES avionics.

The FAA says that FIS-B weather products are for advisory use only. The information provided by FIS-B cannot be used in compliance of any regulatory requirement. Pre-flight weather briefings and in-flight weather updates must be obtained through FAA approved sources only.

Among the FIS-B products being broadcast in ZJX region are:

Aviation Routine Weather Reports (METARs).
Special Aviation Reports (SPECIs).
Terminal Area Forecasts (TAFs) and their amendments.
NEXRAD (regional and CONUS) precipitation maps.
Notice to Airmen (NOTAM) Distant and Flight Data Center.
Airmen's Meteorological Conditions (AIRMET).
Significant Meteorological Conditions (SIGMET) and Convective SIGMET.
Status of Special Use Airspace (SUA).
Temporary Flight Restrictions (TFRs).
Winds and Temperatures Aloft.
Pilot Reports (PIREPS).
TIS-B service status.

Traffic Information Service - Broadcast (TIS-B) is an advisory-only service which enhances a pilot's visual acquisition of other traffic displayed in the cockpit of properly-equipped aircraft. Pilots must continue to exercise vigilance to "see and avoid" other aircraft in accordance with Title 14 of the Code of Federal Regulations Section 91.113b.

TIS-B and FIS-B are available to aircraft equipped with a 978 MHz Universal Access Transceiver (UAT). Aircraft equipped with a 1090 MHz Extended Squitter (1090 ES) will be able to receive only the TIS-B information

The FAA encourages users of TIS-B and FIS-B to report any irregularities observed while using the services.

Reports should contain the following information:

Time of observation.

Location.

Type and identity of the aircraft.

Description of the condition observed.

Type of avionics system and software version used.

Pilots can report issues by contacting the nearest FSS facility or by submitting FAA Form 8470-5, Safety Improvement Report, available from FSSs, Flight Standards District Offices, or general aviation fixed-based operators.